

The Effect of an Aerobic Exercise Program Using Sliding Discs on Weight Loss in Obese Girls

Prof. \ Nasser Mustafa Alsowify

Professor in Department of Sports Health Sciences, Faculty of Physical Education,
Minia University

Dr \ Ahmed Yassen Mohamed

Lecture in Department of Sports Health Sciences, Faculty of Physical Education,
Minia University

Researcher \ Rasha Hana Allah Nassar

Researcher in Department of Sports Health Sciences, Faculty of Physical Education,
Minia University

Introduction and Research Problem:

The World Health Organization (WHO), in partnership with the Food and Agriculture Organization of the United Nations (FAO), organized the Second International Conference on Nutrition. The conference adopted the Rome Declaration on Nutrition and a Framework for Action, which recommends a set of policy options and strategies to promote a diverse, safe, and healthy diet at all ages. The WHO assists countries in implementing the commitments made at the Second Conference (12) (13).

Obesity and overweight are considered negative effects of consuming foods that are not appropriate for blood type. This unsuitable diet slows down the metabolism, reducing the body's fat burning process and causing weight gain. It also leads to water retention, which can lead to thyroid dysfunction. However, adhering to a nutritional program specific to each blood type can eliminate excess fat and maintain an ideal weight (5:30).

Rimmer and Heller (2014) state that low physical activity, along with work that requires prolonged sitting, is one of the main factors leading to obesity. Currently, physical activity levels have declined, especially among young people, with a lack of time devoted to physical activities and exercise, leading to increased obesity rates (7:68).

Hoffman et al. (2010) add that obesity generally leads to many diseases and risks, such as heart disease, diabetes, high blood pressure, joint pain, skin diseases, and strokes. It also leads to respiratory problems (4:22).

Obesity can be defined as excessive fat accumulation above the normal range for age, sex, and body type. It is defined as men having more than 20% body fat and women having more than 30% body fat (1:55).

Balance disc training is a modern trend aimed at improving athletic performance in various aspects. Through it, the physical abilities specific to the sport can be developed, contributing to the development of physical performance and having the greatest impact on raising performance levels. The importance of these exercises lies in their ability to slide, engaging one or more muscle groups with the aim of strengthening and lengthening the major muscles in the body, such as the triceps, hamstrings, biceps, and inner quadriceps (11).

Rates of overweight and obesity continue to rise among adults and children. Between 1975 and 2016, the prevalence of overweight or obese children and adolescents aged 5–19 years increased more than fourfold, from 4% to 18% globally (13).

Spanos and Hankey (2013) believe that obesity can be treated by practicing physical activity or a healthy diet. Drug treatments may be used, although they are often ineffective, which necessitates surgical intervention in cases of extreme obesity (8:12).

Although exercise in general has many general benefits, especially for weight loss, aerobic exercise is the best and most effective in burning fat.

There are many studies that have shown that aerobic exercise reduces the percentage of fatty substances in the blood and rids the individual of excess fat, according to the opinion of the American College of Sports Medicine (ACSM). It indicated that during the first minutes of aerobic exercise, the sugar in the muscles is used to produce the energy the body needs, and the body is not supplied with energy from fat until about 15-20 minutes after the start of the aerobic exercise. Therefore, it is important that the duration of the exercise not be less than 30 minutes. In addition, fat is burned better in the first hour of exercise than in the second hour if the duration of aerobic activity is longer than an hour.

This increases the chances of fatigue and deprives the body of opportunities for recovery. Aerobic exercise has two main goals: the first is to improve the heart and blood vessels, and the second is to burn excess fat (73:43).

Tom, Russell, Mariellel, and Janker (2005) argue that the gliding training system is specifically designed to transform movements into smooth lines of movement. It helps achieve the optimal movement goal easily and consistently, using a variety of exercises that vary depending on the goal of the movement. Other programs and tools are difficult and sometimes expensive, which gives gliding training its importance (10:40).

Monika Chopra (2020) notes that discs are available in two types: discs made of plastic or reinforced fiber that can be used smoothly on rough or hard floors, and flexible discs made of nylon that can be used on rugs or carpets, making them easy to use indoors, as they are lightweight, easy to use, and achieve significant results (5:192).

Tom, Russell, Mariellel, and Janker (2005) (10) point out that the gliding training system is specifically designed to transform movements into smooth lines of movement.

Janker (2005) (10) stated that the sliding disc exercises are considered an integrated program for physical abilities, as they are characterized by continuity in performance without feeling tired or bored, with a feeling of happiness and joy during performance. Practicing the sliding disc exercises regularly leads to improving physical abilities by developing strength, flexibility, and balance. The sliding disc exercises also aim to provide the individual with aerobic capacity, and practicing these exercises, which include exercises to develop strength, flexibility, coordination, agility, endurance, and balance, which makes the heart rate reach its highest rate, which helps to raise physiological and physical efficiency. The sliding disc exercises are also considered a new method for a contemporary physical fitness program that is practiced in a group manner, characterized by excitement and fun. It is suitable for individuals for whom some other activities are not suitable. The goal of practicing the sliding disc exercises is not for the practitioner to become proficient in performing these exercises, but rather the goal is to improve the physical and physiological abilities of the body in general and maintain health .

These exercises represent a new approach to a contemporary fitness program practiced in a social atmosphere characterized by excitement and enjoyment. They are suitable for individuals who are not suited to other activities. The goal of practicing balance disc exercises is not to become proficient in performing these exercises, but rather to improve the physical and physiological fitness of the body in general and maintain health (11).

Exercise has a positive impact on an individual's overall health, as it helps increase and elevate the individual's level of physical fitness by developing its various components, improving the functioning of the body's functional systems, and increasing the efficiency of mental and psychological aspects. This, in turn, elevates the individual's health status, enabling them to become a good citizen whose work efficiency increases, their productivity increases, and the chances of developing illness decreases. This increases their natural immunity, protects them from disease, and relieves anxiety, stress, and depression.

Physical activity plays an important role in changing the energy balance equation, towards eliminating excess calories from the body and consuming them through movement, and eliminating the accumulation of body fat. Physical activity also has many health benefits other than weight loss. In light of the above, it can be said that regular exercise is part of the overall social and economic development of society, a vital duty, and an essential means of achieving community health.

Through the researcher's work as a fitness trainer, she observed that women in general, and obese women in particular, are more likely to exercise and participate in training programs if they are modern, fun, and enjoyable, such as using sliding discs. However, they are less likely to participate if the exercises are boring and monotonous.

Through the researcher's review of studies and research, such as Steven David Verba's (2011) (9) and Francine J. Silver's (2002) (3), the importance of aerobic training programs for weight loss among girls became clear. Furthermore, to the best of the researcher's knowledge, none of the studies addressed the inclusion of a training program using sliding discs in an aerobic exercise program. This motivated the researcher to conduct this research on the effect of an aerobic program using sliding discs for weight loss among obese girls aged 12–15 in Minya. Research objective:

- The effect of aerobic exercise using balance discs on weight loss in obese women.

Research hypotheses:

In light of the research objective, the researcher formulated the following hypotheses:

1. There are statistically significant differences between the pre- and post-measurements of the experimental group using aerobic exercise using balance discs on weight loss among obese women, in favor of the post-measurement.

Terms used in the research:**Obesity:**

The excessive accumulation of fat in subcutaneous fat cells and around the body's internal organs (13).

Training using sliding discs:

A new training method using lightweight discs that is characterized by the ability to perform a number of exercises similar to ice skating movements, which can be performed in a small space and with multiple exercise capacities (13).

Previous Studies

- Steven David Verba's study (2011) (9) entitled "The Effect of Weight Loss and Exercise on Cardiovascular Structure and Function in Class II and III Obese Women." The study aimed to identify the effect of diet or exercise, in addition to weight loss, on the structure and function of the heart in Class II and III obese women. The experimental approach was used on a sample of twenty-four (24) women who underwent a diet for 12 weeks. The results resulted in a significant decrease in body weight, and there were significant results regarding the effect of weight loss and exercise on the structure and function of the heart in Class II and III obese adults.

- Francine J. Silver's (2002) (3) study, titled "The Effect of Aerobic Exercise and Slow-Speed and Speed-Speed Strength Training on Body Composition and Weight Loss in Obese Women," aimed to identify the effects of aerobic exercise on changes in body fat, weight, body mass index (BMI), and circumferences in obese women. An experimental approach was used on a sample of sixty-five (65) obese women, who were divided into three groups (aerobic exercise alone, slow-speed aerobic exercise and strength training alone, or simultaneous and slow-speed strength training). The exercise program was implemented for six months. The results indicated a significant decrease in body fat, weight, and BMI.

Research Plan and Procedures

Research Methodology:

Given the nature of the research and to achieve its objectives and hypotheses, the researcher used the experimental approach with an experimental design for three groups using (pre- and post-) measurement.

Research Population:

The research population comprises 148 obese female students aged 12–15 years from the second year of primary education in Minya City, weighing more than 60 kilograms.

Research Sample:

The researcher randomly selected the research sample from the research population, which consisted of (10) female students. The sample underwent aerobic exercise using sliding discs.

The exploratory sample consisted of (12) female students from the research population and outside the primary sample. The researcher used these students to verify the validity of the research tools.

Data Collection Tools:

First: Devices and Tools:

- For measurements, the researcher used: a Rest Meter to measure total body height to the nearest centimeter / a Taneta scale to measure weight and body composition.
- The researcher also used training tools to train a Stop Watch program to measure time to the nearest (0.01) second / training mats / sliding discs / training cones.

Second: Research Tests:

The researcher developed the proposed tests that were appropriate for the research sample and achieved its objective (Attachment No. [2]). The researcher developed the following tests:

- Body weight.
- Body mass index.

Scientific coefficients for the tests:**A - Validity:**

To calculate the validity of the tests, the researcher used the validity of the two-tailed comparison. The researcher applied these tests to a survey sample of (12) female students. The significance of the differences between the lower and upper quartiles was calculated, as shown in Table (1)

Table (1)
Significance of the differences between the lower and upper quartiles for the tests under investigation

Variables	Lower Quartile			Upper Quartile			Significance level	Z value
	Arithmetic Mean	Average Rank	Sum of Ranks	Arithmetic Mean	Average Rank	Sum of Ranks		
Body weight	73.33	5.00	15.0	70.67	2.00	6.00	1.99 *	0.046
Body mass	31.41	5.00	15.0	29.20	2.00	6.00	1.96 *	0.050

Table (Z) value at a significance level of $(0.05) = 1.96$ $(0.01) = 2.58$

*Significant at a significance level of (0.05)

** Significant at a significance level of (0.01)

Table (1) shows the following:

- There are statistically significant differences between the lower and upper quartiles of the tests under study, in favor of the upper quartile. This indicates the validity of the tests under study and their ability to discriminate between the two different groups.

B - Reliability:

To calculate the reliability of the tests under study, the researcher used the test-retest method on a sample of (12) female students from outside the study sample who had the same specifications as the original sample, with a time interval of (3) three days between the first and second applications. Table (2) shows the correlation coefficients between the two applications.

Table (2)
Correlation coefficient between the first and second applications
of the tests under study (n = 12)

Variables	First Application		Second Application		Correlation Coefficient
	Arithmetic Mean	Standard Deviation	Arithmetic Mean	Standard Deviation	
Body weight	71.92	1.24	71.83	1.40	0.93 **
Body mass	30.34	0.90	30.49	0.92	0.93 **

Table (r) value at a significance level of $(0.05) = 0.576$ $(0.01) = 0.708$

*Significant at a level of (0.05)

** Significant at a level of (0.01)

Table (2) shows:

- The correlation coefficients between the first and second applications in the tests under study ranged between (0.93), which are statistically significant correlation coefficients, indicating the stability of the tests .

Third: The proposed aerobic exercise program using sliding discs:

The goal of the program: to reduce weight in obese girls aged 12-15 years.

The content of the training program:

- The total duration of the program in weeks, then distributed over periods: (12 weeks).
- The degree, size, and gestational cycle of the program according to the Karvonen method: The gestational cycle used in the program is (2:1).
- Number and duration of training units and weekly program duration: The training program includes (4) training units per week (Saturday, Sunday, Tuesday, and Thursday).

Degree (intensity) of training load in the program:

- Moderate load = 40-50% of maximum heart rate.
- High load = 50-60% of maximum heart rate.
- Maximum load = 60-70% of maximum heart rate.

Research Implementation Procedures**Exploratory Study:**

The researcher conducted physical tests on Sunday, September 22, 2024. The tests were repeated on Wednesday, September 25, 2024, to ensure the validity and reliability of the tests. The exploratory study also aimed to train assistants on the tests and tools used.

The researcher also implemented a training unit (randomly selected from the proposed exercise program) to ensure its suitability for the research sample and to ensure the safety and validity of the tools used in the exercise program on Thursday, September 26, 2024.

Pre-measurement:

The researcher conducted a pre-measurement of the research sample on the variables (body weight/body mass) on Sunday, September 29, 2024.

Implementation of the proposed program:

The proposed exercise program was applied to the research sample from October 1, 2024, to December 31, 2024.

Post-measurement:

The researcher conducted a post-measurement of the research sample after completing the implementation of the proposed exercise program, using the same method as the pre-measurement, on Saturday, January 2, 2025.

Statistical methods used:

- Arithmetic mean.
- Correlation coefficient.
- Median.
- Wilcoxon non-parametric test.

- Standard deviation.
- Percentage improvement rate.
- Skewness coefficient.
- Analysis of variance test.
- Mann-Whitney non-parametric test.
- Scheffe test to determine the direction of the differences.

The researcher settled on a significance level of (0.05, 0.01). The researcher also used the SPSS program to calculate some statistical coefficients.

Presentation and discussion of the results

Results of the first hypothesis: which states:

There are statistically significant differences between the pre- and post-measurements of the experimental group using aerobic exercises using balance discs to lose weight among obese women, in favor of the post-measurement.

Table (3)

Significance of statistical differences between the average ranks of the pre- and post-measurements of the research group with whom the aerobic program was used in the variables

(n = 10)

Variables	Pre-test			Post-test			Significance level	z value
	Sum of ranks	Average ranks	Arithmetic mean	Sum of ranks	Average ranks	Arithmetic mean		
Body weight	71.90	5.50	55.00	55.50	0.00	0.00	0.05	2.82 **
Body mass	30.53	5.50	55.00	23.56	0.00	0.00	0.05	2.80 **

Table (Z) value at a significance level of (0.05) = 1.96 (0.01) = 2.58

*Significant at a significance level of (0.05)

** Significant at a significance level of (0.01)

Table (3) shows the following:

- There are statistically significant differences between the average ranks of the pre- and post-measurements of the first experimental group using the aerobic program in health fitness variables and some biological variables in favor of the post-measurement.

Table (4)
Percentage improvement rates between the pre- and post-
measurements of the research sample group using the aerobic program
in the variables {weight/body mass}
(n = 10)

Variables	Average pre-measurement	Average post-measurement	z value
Body weight	71.90	55.50	22.81 %
Body mass	30.53	23.56	22.83 %

Table (4) shows the following:

- The percentage improvement rates between the pre- and post-measurements for the first experimental group using the aerobic program on the research variables ranged between (22.81% - 22.83%), indicating the impact of the aerobic program in improving these variables for the research sample using the aerobic program.

By reviewing the results of Tables (3) and (4), we find a clear and statistically significant improvement in the elements of health fitness and biological variables for the first experimental group using the aerobic program.

The researcher attributes this result to the proposed and standardized aerobic program using sliding discs, which is compatible with the physical and physiological condition of obese women (the research sample) and achieves its goal of improving physical and physiological condition. Furthermore, regular exercise and weekly training sessions allow the body to adapt to the effort expended, particularly in burning fat and generating the energy required to equal the effort required in the proposed exercise program. The researcher also attributes the nature of aerobic exercise, which lasts for more than twenty minutes, to fat burning and, consequently, improved body composition.

These exercises are characterized by low intensity, making exercise easier to perform and facilitating continuity. When music is added, it increases the student's sense of happiness, pleasure, and continued training. The student's sense of positivity about the program is further enhanced by the ease of the program's exercises, which are characterized by a gradual progression from easy to difficult, with performance appearing smooth and effortless.

The results also agree with the study by Francine J. Silver (2002) (3), which stated that practicing aerobic exercise led to a positive improvement

in a significant decrease in body fat, weight, body mass index, and body circumferences in the research sample.

Thus, the first hypothesis was achieved, which states: "There are statistically significant differences between the average scores of the pre- and post-measurements of the first experimental group using the aerobic program in health fitness variables and some biological variables, in favor of the post-measurement."

Conclusions and Recommendations

First: Conclusions

In light of the research results, which achieved its objective and were achieved through verifying the hypotheses established for this purpose, the researcher reached the following conclusions:

- There are statistically significant differences between the average ranks of the pre- and post-measurements of the research sample members who used the aerobic program using gliding discs for weight loss, in favor of the post-measurement.
- Training using gliding discs had a clear and noticeable positive impact on the percentage of fat and weight loss under study.
- Physical activity and nutritional education programs had a clear positive impact on body composition among obese females aged 12-15 years.

Second: Recommendations

In light of the research findings, the researcher recommends the following:

- Implement the aerobic program using gliding discs proposed by the researcher.
- Integrate the aerobic program using gliding discs with nutritional education sessions, as part of the presidential initiative launched by President Abdel Fattah El-Sisi for the Fitness of Egyptians.
- Incorporating aerobic exercises using sliding plates into physical education classes for female students at schools.
- Encouraging obese women to engage in daily physical activity so that it becomes a part of their daily lives.

Reference list

1. Baur, L. De, S., & Small, J.: Overweight and Obesity among children with developmental disabilities ., *J Intellect Dev Disable*, 33(1), 43 – 47, 2008.
2. Chuck krautblatt : fitness training Manual, *American college of sports Medicine (ACSM) copyright by fa*, 2000 .
3. Francine J Silver : The effect of aerobic exercise and slow – speed strength training on body composition and weight loss in obese women, *Ph.D., Fairleigh Dickinson University*, 2002.
4. Hoffman, D., & Reinehr, T., Dobe, M., Schaefer, A: Obesity in disabled children adolescents: *an overlooked group of patients Dtsch Areztebl Int*, 107(15), 268 -275, 2010.
5. Monika Chopra; Exercises with Core Sliders: 40+ Exercises to strengthen your Core & Sculpt your Mid-section using Gliding Discs (Fitness Sutra), *Kindle Edition, Fitsutra Wellness Pvt Ltd*, 2020.
6. Peter J.D Adamo & Catherine Whitney ”live Right y your Type “*library of congress in USA.*, 2001. 79
7. Rimmer, J., & Heller, T.: Obesity and associated factors in adults with intellectual disability, *Journal of intellectual Disability Research*, 58 (9), 851 - 863, 2014.
8. Spanos, D., Melville, C., & Hankey, C.: weight management interventions in adults with intellectual disabilities and Obesity, *a systematic review of the evidence, Nutrition Journal*, (21), 2013.
9. Steven David Verba :the: The effect of Weight loss and exercise on cardiovascular structure and function in Class and obese women, *Ph.D. University of Pittsburgh*, 2011.
10. Tom Baranowski, Rusell Jago, Mariellel, Janker. Effect of 4 weeks of Pilates on the body composition of young girls, *available online*, 27 December 2005.

Internet references:

11. [http:// www.Brighthub.com/ health/fitness articles](http://www.Brighthub.com/health/fitness/articles) .2016. 93
12. <http://www.glidingdisks.com/topfitnesspros.html> .2016. 94
13. https://www.who.int/ar/health-topics/obesity#tab=tab_1 95

ملخص البحث باللغة العربية

**تأثير برنامج تمرينات هوائية باستخدام أقراص الانزلاق
على إنقاص الوزن لدى الفتيات البدنيات**

* أ.د / ناصر مصطفى
السويقي
** د / أحمد يسين محمد
*** الباحثة / رشا حنا الله نصار

يهدف البحث إلى الكشف عن تأثير التمرينات الهوائية باستخدام أقراص الانزلاق على إنقاص الوزن لدى السيدات البدنيات ، نظراً لطبيعة البحث وتحقيقاً لأهدافه وفروضه استخدمت الباحثة المنهج التجريبي بالتصميم التجريبي لثلاثة مجموعات باستخدام القياس (القبلي – البعدي) لهم ، قامت الباحثة باختيار عينة البحث بالطريقة العشوائية من مجتمع البحث وقد بلغ عددها (10) تلميذات تتراوح أعمارهم ما بين 12 : 15 سنة من تلميذات المرحلة الثانية للتعليم الأساسي بمدينة المنيا واللاتي تتجاوز أوزانهن أكثر من 60 كيلو جرام والمصابات بالسمنة واللاتي يطبقن التمرينات الهوائية باستخدام أقراص الانزلاق ، في ضوء نتائج البحث تحقيقاً لهدفه والتي جاءت من خلال التأكد من الفروض التي وضعت لذلك فقد توصلت الباحثة للاستنتاجات الآتية : توجد فروق دالة إحصائية بين متوسطي رتب القياسين القبلي والبعدي لأفراد عينة البحث المستخدم معها البرنامج الهوائي باستخدام أقراص الإنزلاق في إنقاص الوزن لصالح القياس البعدي ، إن التدريبات باستخدام أقراص الإنزلاق أثرت تأثيراً إيجابياً واضحاً وملحوظاً علي نسبة الدهون وإنقاص الوزن قيد البحث ، ممارسة النشاط البدني وبرامج التنشيط الغذائي أثرت تأثيراً إيجابياً واضحاً على التكوين الجسمي لدى البدنيات في المرحلة العمرية من 12 – 15 سنة.

* أستاذ التربية الصحية قسم علوم الصحة الرياضية بكلية التربية الرياضية بجامعة المنيا .

** مدرس بقسم علوم الصحة الرياضية بكلية التربية الرياضية بجامعة المنيا.

*** باحثة بقسم علوم الصحة الرياضية بكلية التربية الرياضية بجامعة المنيا .

Research Summary in English

The Effect of an Aerobic Exercise Program Using Sliding Discs on Weight Loss in Obese GirlsProf. \ **Nasser Mustafa Alsowify***** D \ **Ahmed Yassen Mohamed**Researcher \ **Rasha Hana Allah Nassar** **

The research aims to investigate the effect of aerobic exercise using gliding discs on weight loss in obese women. Given the nature of the research and to achieve its objectives and hypotheses, the researcher used the experimental method with an experimental design for three groups using (pre- and post-) measurements. The researcher randomly selected the research sample from the research community. The sample numbered (10) female students, aged between 12 and 15 years, from the second stage of basic education in Minya City, whose weight exceeds 60 kilograms and who are obese and who practice aerobic exercises using gliding discs. In light of the research results, in order to achieve its objective, which came through verifying the hypotheses set for it, the researcher reached the following conclusions: There are statistically significant differences between the average ranks of the pre- and post-measurements of the research sample members who used the aerobic program using gliding discs to lose weight in favor of the post-measurement. Exercises using gliding discs Physical activity and nutritional education programs had a clear and noticeable positive impact on body composition in obese girls aged 12-15 years.

* Professor in Department of Sports Health Sciences, Faculty of Physical Education, Minia University

** Lecture in Department of Sports Health Sciences, Faculty of Physical Education, Minia University

***Researcher in Department of Sports Health Sciences, Faculty of Physical Education, Minia University